

DAIRY SHEEP AND GOAT INDUSTRIES



BASICS

OVERVIEW

- Today's agricultural market is shifting in its productive patterns. With the advent of "exotic" consumptive trends, new niches have been created in all aspects of our society.
- Both the dairy sheep and goat industries are poised on a market that could unfold into a new awakening in production capabilities.
- Three ingredients are essential in the creation of a new niche market: customer demand must be there for specific products, an agricultural product in high enough numbers to support a fledgling industry, and a manufacture/distribution base to supply the demand.
- At least 10 countries depend on goats and sheep for between 30 to 76% of their total milk supply.
- Greece produces 178 kg of milk per person per year with 61% from sheep and goats.
- Domestic supply from all milk sources is <100 kg/person per year, and annual apparent yields average <100 kg of milk/goat, <50 kg of milk/sheep, which makes supplies of animal protein and calcium from domestic sources very low.
- The small population of DHIA tested U.S. dairy goats averaged >700 kg of milk/goat per year in recent years, and some dairy sheep breeds may produce as much as 650 kg/yr.
- There have been dramatic increases in dairy goat populations during the last 20 years: 52% for the world, 56% for developing countries, 17% for developed countries, while sheep populations decreased by 3% for the world, by 6% in developed countries, but increased 14% in developing countries.
- Results have shown in many cases that dairy goats and dairy sheep can be very profitable, even in developing countries with difficult climate and topographical conditions.
- Mastitis pathogens in small ruminants vary considerably from that of cattle. In subclinical cases, coagulase negative *Staphylococcus* account for the vast majority of cases. Clinical mastitis is most commonly associated with *Staphylococcus aureus*, or *Mannheimia* sp. Compared to cattle, coliform mastitis is rare, likely due to the differences in moisture content of the manure and a decreased risk of manure contamination of the teat.
- Most commercial dairy farms utilize modern milking parlors with milking pipelines and "clean-in-place" (CIP) systems. Appropriate milking vacuum pressures are similar to those used in the dairy cattle industry, however pulsation rates may be increased in some cases.
- Unlike dairy cattle where milk is generally picked up from the farm every other day by milk processors, many small ruminant processors only pick up milk twice per week. This makes maintenance of milk quality more challenging in small ruminant operations.
- Unlike the dairy cattle industry where maximum bulk tank somatic cell counts (SCCs) have decreased over the last several years (and there is interest in further decreasing them), goat milk bulk tank SCCs are still allowed to be 1.5 million cells per mL for Grade A milk. This is largely associated with differences in the types of SCC in goats (see below for more detail) and the increased propensity of goats to shed more somatic cells while they are in estrus. However, well-run dairy goat operations with good milking parlor management are able to maintain SCCs below 1 million/mL.

- The extremely low number of approved drugs for small ruminants, and the complete lack of approved intramammary drugs for small ruminants, necessitates that small ruminant dairy operations maintain a good working relationship with their veterinarian. Appropriate extra label drug use and oversight is absolutely necessary to assure milk quality.
- Common sheep dairy breeds include East Friesian, Awassi, Lacaune, Malpica (Awassi x Manchega), and Chios; Dorset, Finn, Lincoln, Rambouillet, or Suffolk breeds
- There are eight popular breeds of dairy goats producing milk in the United States: Saanen, Nubian, Alpine, Toggenburg, LaMancha, Sable, Nigerian Dwarf and Oberhasli.

DAIRY GOAT PRODUCTION

- More people consume milk from goats than from any other animal species.
- Currently it is estimated that there are over 500 million goats worldwide producing an estimated 4.8 million tons of milk that is consumed on a local level or produced into cheese and yogurt.
- Current US inventories of dairy goats include approximately 375,000 animals. This number demonstrates the significant growth in the industry in recent years compared to the 290,000 inventory in 2002.
- Wisconsin has the largest population of dairy goats (44,000) followed by California (40,000), Iowa (31,000) and Texas (23,000).
- The upper Midwest (WI, IA, and MN) represents the largest dairy goat milkshed with approximately 25% of the nation's dairy goat inventory located in this region. This growth has been fueled by the development of at least four major dairy goat milk processors in the region.
- Current (2016) dairy goat milk prices in the upper Midwest have a base price around \$36/cwt (\$36 per hundred weight or 100 pounds).
- Goats differ in many ways from dairy cows. Seasonality of breeding and milk production occurs in goats. As a consequence there is inconsistent fluid milk availability in the winter months when many goats are dry. In order to promote out-of-season milk production many milk processors offer a premium price (as much as 10-15% over base) for winter milk.
- Based on DHIA records thirty-five percent of dairy goat lactations were at least 305 days in length, averaging 1,978 lb of milk and 73 lb of fat with a 3.7% fat average (this varies by breed and environment).
- There also can be a difference in milk production reflected in prolificacy. Saanen does delivering twins produce 27% more milk during the first 50 days of lactation than if a single birth had occurred. Those producing triplets give 47% more milk than a single birth. These differences persisted at least until 150 days of lactation. It is thought that increased levels of placental lactogen related to these multiple births resulted in increased mammary development and function.

Goat Industry Facts

- Goat milk contains more easily digested fat and protein content.
- Increased protein digestibility has formed a niche market in infant, convalescent, and allergenic diets.
- Goat milk has excellent buffering quality and is frequently recommended for ulcer patients.
- Goat milk can often successfully replace cow's milk in allergic patients.
- Goat milk is extremely important in developing niche cheese and fluid milk specialty markets.
- Curd tension: goat range, 10–70 g; cow range: 15–200 g

- Goat milk is more naturally homogenized: goat fat globules = 2.0 μm ; cow fat globules = 2.5–3.5 μm
- Goats are seasonally polyestrous.
- Goats regularly deliver twins, triplets, and even quadruplets.
- Goat milk is secreted via an apocrine mechanism, unlike cow and sheep milk. This results in the release of non-nucleated cytoplasmic vesicles that can be confused for somatic cells. As a consequence the pasteurized milk ordinance (PMO) requires that a nuclear staining method be used for regulatory activity regarding SCC in goats.
- Somatic cells in milk are considered an indicator of both the mammary health and the quality of milk produced. Generally, the goat has a normal baseline SCC that is much higher than cows. In some cases this does not reflect a disease state but a difference in milk composition. However the practitioner should always consider underlying subclinical or clinical mastitis when SCCs are elevated.
- Goat milk can easily develop off-flavors if the herd is not properly managed. Genetics of a specific goat, consumption of strong flavored plants, medicines and milk handling can impart these off-flavors; however, in the well-managed herd, taste differences are minimal between the milk of goats and cows.

DAIRY SHEEP PRODUCTION

International Cheese Production

- Currently it is estimated that >100 million sheep are used for milk production worldwide.
- France and Spain produce the largest quantities. Europe is by far the largest producer of sheep milk, cheese, and yogurt. France currently milks approximately 7 million cows, 1 million goats, and 1 million sheep. In Spain, 5 million sheep are milked commercially. Italy and Greece are also leaders in production.
- France has the most economically developed dairy sheep industry. Though prices may vary, sheep's milk may bring from \$35 to \$65/cwt compared with \$15 to \$25/cwt for goat's milk.
- In France, sheep are milked for 205–210 days or seven months (December–July) with a production of about 128 L (a liter is 2.2 lb or 1.06 quarts) per ewe, up from an average production of 76 L in 1950. The production of milk comes from more than 3000 sheep milk producers (mostly in the area of Rodez, France) who milk an average of 220 ewes apiece. Sheep milk in the United States brings approximately \$60–\$65/cwt.
- The primary end product of sheep milk is cheese. It only takes about 4 lb of milk to produce a pound of cheese, whereas it takes 8–10 lb of cow's milk to produce a pound of cheese.
- About 65–70% of all sheep's milk in France is used for production of Roquefort cheese. The milk in excess of that for Roquefort production is often sold to cheese producers in Italy.

Domestic Cheese Production

- Direct marketing is becoming a larger market for many producers. However, quality control must be extremely high to be competitive with the European market products.
- Sheep dairying is suited to production on small farms where forage-based production is the key to economic success.
- Blending of cheese (sheep and cow or sheep and goat) can produce some extremely rich cheeses.
- Sheep's milk contains 200% more fat, 40% more protein, and 30% more total solids than cow's milk. It has the ability to impart a distinctive texture, flavor, and aroma to cheese.
- The U.S. imports >65 million pounds of sheep cheese annually worth in excess of \$115 million wholesale. These cheese types are Manchega from Spain, ricotta and Pecorino from

Italy, feta from Greece, and Roquefort from France. Yogurt from sheep is even more profitable, rating very high in consumer preference tests.

- The “Holsteins” of the sheep industry are the East Friesians, a German dairy sheep breed. Though these animals have extremely high milk production, they are rare in the United States. The U.S. Department of Agriculture has severe import restrictions leading to decreased numbers and a diminished gene pool. Currently, one of the few sources of this breed is Canada. This low genetic diversity has been a limitation to the industry; however, Friesian cross ewes have twice the production of Dorset ewes currently used in this country. The introduction of 25% East Friesian breeding will double this production to 220–250 lb in the same time period. Purebreds average 4.8 lb per day of milk production.
- The East Friesian breed is also very prolific with a lambing percentage of 220–230%.
- Management of lamb weaning differs greatly from goat and cow dairies. In many operations the lambs are allowed to nurse the dam for the first 30–45 days and then are weaned. During that period of time the dam may not be milked in the parlor or may be milked to collect what milk the lambs have not consumed.

Sheep Industry Facts

- Sheep’s milk contains 6%–8% fat and 5%–7% protein.
- There are approximately 100 sheep dairy farms in the U.S. These are primarily located in the upper Midwest, the northeast and the maritime provinces of North America.
- In 1994, 66 million pounds of sheep’s milk cheese was imported into the U.S. with a value of \$118 million.
- Sheep’s milk is higher in total solids than goat or cow’s milk.
- Sheep’s milk sells for around \$40–65/cwt, but sheep produce less milk.
- Crossbred ewes in a Wisconsin study milked 3 pounds per day over a 150-day lactation.
- Freezing and storing sheep milk does not hurt its cheese production capabilities.
- Specialty cheese products: Feta, Manchego, Romano, and Roquefort.
- Cheese makers can produce twice as much cheese from a pound of sheep’s milk as cow’s milk, but the sheep’s milk generally costs more than other milks.



MISCELLANEOUS

ZOONOTIC POTENTIAL

- Several small ruminant diseases are zoonotic (e.g., tuberculosis, Q-fever, brucellosis, Listeriosis, Salmonella). Care must be taken in the collection of laboratory samples and the diagnosis/treatment of affected animals. Consumption of unpasteurized milk and dairy products can be a source of transmission of some of these diseases.

SEE ALSO

- Body Condition Scoring: Goats (www.fiveminutevet.com/ruminant)
- Body Condition Scoring: Sheep (www.fiveminutevet.com/ruminant)
- Goat Milk Quality (www.fiveminutevet.com/ruminant)
- Goat Nutrition (www.fiveminutevet.com/ruminant)
- Ewe Flock Nutrition (www.fiveminutevet.com/ruminant)
- Mastitis: Monitoring (www.fiveminutevet.com/ruminant)

ABBREVIATIONS

- DHIA = Dairy Herd Improvement Association
- Cwt = one hundred weight, or one hundred pounds
- PMO = Pasteurized Milk Ordinance
- SCC = somatic cell count
- USDA = United States Department of Agriculture

Suggested Reading

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